

RA Briefing: Lifetime Cancer Risks - Hazardous Air Pollutant Emissions from the Sasol Westlake, LA Facility

January 18, 2022

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Introduction/Risk Assessment Overview

- EPA uses risk assessment to estimate cancer and noncancer public health risks from inhalation of Clean Air Act hazardous air pollutants. Assessments are used in both regulatory and discretionary (informational) air program efforts.
- Assessments are performed by using facility reported emissions in computer models to predict air impacts offsite.
- Results are predicted estimates of public health risks from inhalation of air toxics. They do not indicate actual noncancer or cancer cases in citizens.
- EPA inhalation risk values for hazardous air pollutants, by themselves, are not regulatory limits EPA can enforce. The Clean Air Act does direct EPA to develop ambient air quality standards for air toxics.
- EPA conducted a site-specific risk assessment on Sasol Lake Charles Chemical Complex to predict impacts on the Westlake (Mossville), LA community area.

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IRIS Value Overview

- In 2016, EPA published the Integrated Risk Information System (IRIS) assessment for ethylene oxide (EtO) and classified EtO as a human carcinogen. Widely accepted studies associate EtO exposures with increased risk of cancers of the white blood cells, and increased risk of breast cancer in females.
- The EtO inhalation unit risk estimate from the IRIS assessment translates to an air concentration of 0.02 ug/m³. This level represents a long term (lifetime) estimated cancer risk of 100 in a million.
- Modeled (or monitored) levels of EtO above this concentration call for additional efforts to reduce EtO emissions, as emissions may be causing elevated EtO levels outside facility fence-lines.
- The IRIS value and methodology has been challenged by industry and TCEQ in a data quality correction request and in response to several rulemakings where EPA considered the EtO inhalation risk value. EPA stands behind the EtO IRIS value as the appropriate human health value to use.

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Human Exposure Model (HEM) Overview

- HEM is used primarily for performing risk assessments for sources emitting air toxics into ambient air.
 - Model addresses inhalation pathway of exposure.
 - Model provides ambient air concentrations for use with unit risk estimates and inhalation reference concentrations to produce estimates of cancer risk and noncancer hazard for modeled air toxics.
 - Exposure variables (e.g., duration, human activity patterns, residential occupancy period, etc.) are not explicitly addressed.
- HEM contains: (1) atmospheric dispersion model, AERMOD, with included meteorological data, and (2) U.S. Census Bureau population data at the Census block level.
 - Modeler must provide model inputs regarding source parameters (emission rates, stack heights, exit velocity, etc.).

Additional information about the Human Exposure Model available at:
<https://www.epa.gov/fera/risk-assessment-and-modeling-human-exposure-model-hem>

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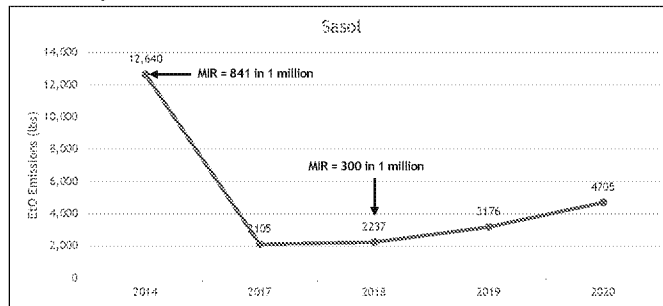
HEM Inputs

- HEM utilizes 3 built-in libraries along with user input facility emissions to model ambient concentrations and calculate associated risk estimates.
- Meteorological data library used by AERMOD dispersion model.
 - One year (2019) of hourly surface and upper air meteorological observation data.
- Census block library used in human exposure calculations.
 - Contains census block internal point locations and population along with elevation and controlling hill height (used in dispersion calculations).
- Dose-response values library used to estimate health risk.
 - Contains pollutant-specific values.
- Facility-specific HAP emissions data based on 2018 National Emissions Inventory (NEI).
 - NEI contains annual air pollutant emission estimates.
 - NEI also contains stack information for sources that emit HAPs.
 - Hourly emission rates for HEM are generated by evenly dividing the total annual emission rates from NEI into the 8,760 hour of the year.

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Sasol EtO Emissions Overview

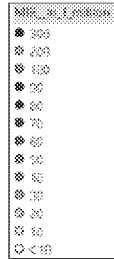
- HEM results for 2018 modeled emissions: Maximum Individual Cancer Risk = 300 in 1 million.
- Facility has three main units that emit EtO:
 - (1) Ethoxylation Unit; (2) Ethylene Oxide/Ethylene Glycol Unit; and (3) Research and development laboratory on site.
- Since 2014, EtO emissions at the facility have been reduced approximately 63%.



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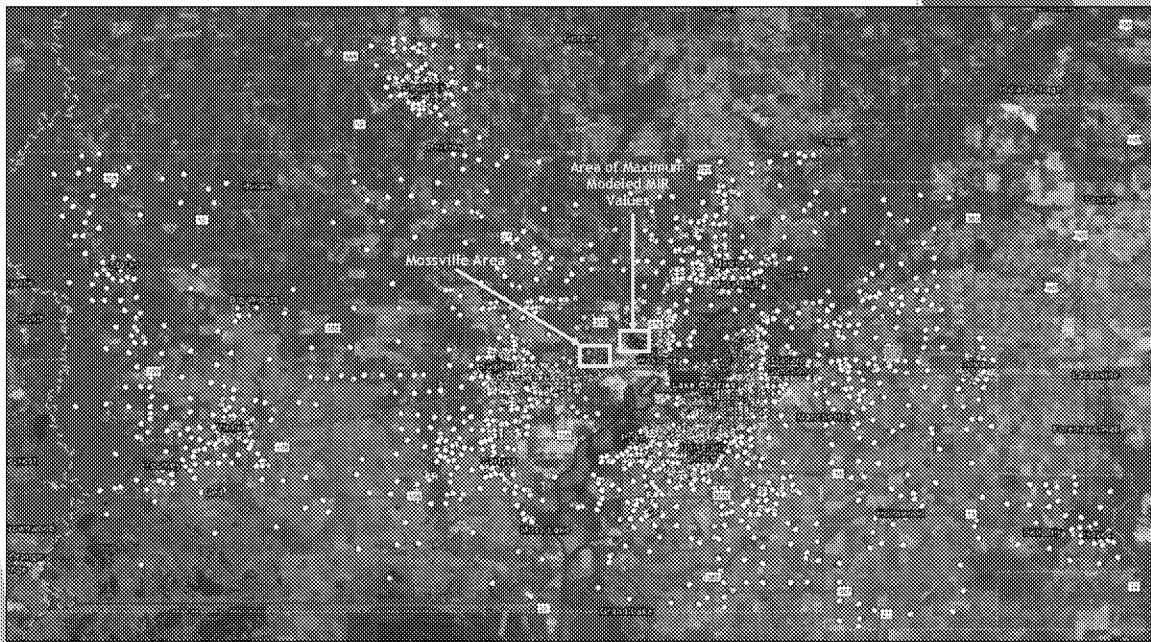
Sasol HEM Results - Entire Domain

- Domain included every census block located within 50 km of the Sasol facility.
- Receptors located at approximate center of each census block.



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Sasol HEM Results - Sub Domains



Sasol HEM Results - Maximum MIR Values

- Maximum modeled MRI values located to northeast of Sasol property boundary.
- All MRI values ≥ 100 located in this area.

Range of Lifetime Individual Cancer Risk (Chance in One Million) ¹	Number of People within 50 km of the Facility in Different Ranges for Lifetime Cancer Risk ²					
	Total Pop.	White	African Amer.	Native Amer.	Other & Multi-racial	Hispanic or Latino
100 < 200	333	235	98	0	0	0
200<300	152	114	38	0	0	0
≥300	8	7	1	0	0	0

¹Range of Lifetime Individual Cancer Risk. Modeled risks are for a 70-year lifetime, based on the predicted concentration and not adjusted for exposure factors.

²Distributions by race are based on demographic information at the Census block group level.



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Sasol HEM Results - Mossville Area



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Questions/Discussion

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